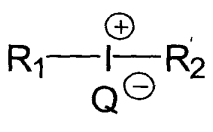
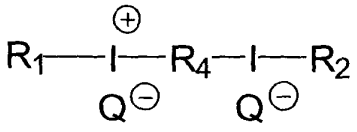
Claims

1. A method for producing an onium salt derivative, characterized by comprising reacting an onium salt derivative represented by any one of formulas (1) through (4):



(1)



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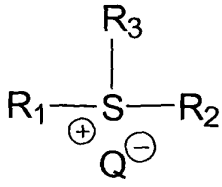

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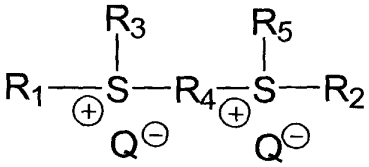
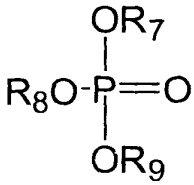


(4)

wherein each of R_1, R_2, R_3, and R_5 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, an aralkyl group, or a phenacyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; one or both of the pairs of R_1 and R_3, and R_2 and R_5 may together form a divalent organic group; R_4 represents a C≤20 divalent organic group; and Q represents a halide anion or a C≤10 carboxylate anion,

with a compound represented by any one of formulas (5) through (7):

(5)



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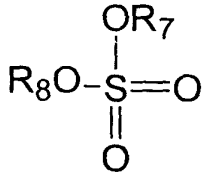
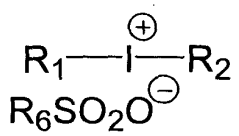


(7)

wherein R_6 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, or an aralkyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; R_7 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, or an aralkyl group, each of these groups having ≤10 carbon atoms and being optionally substituted; and each of R_8 and R_9 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, or an aralkyl group, each of these groups having

≤10 carbon atoms and being optionally substituted,

to thereby yield an onium salt derivative represented by one of formulas (8) through (19).



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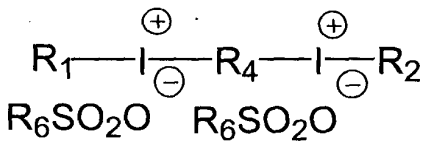

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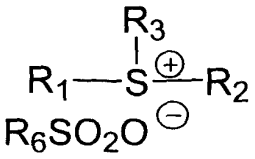

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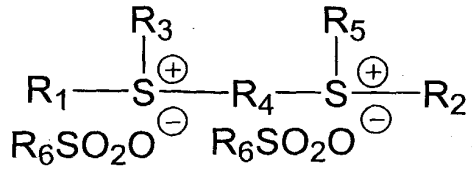

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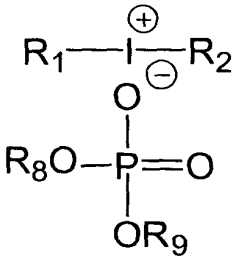

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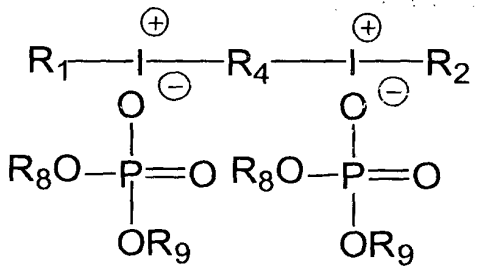

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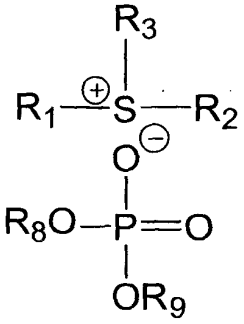

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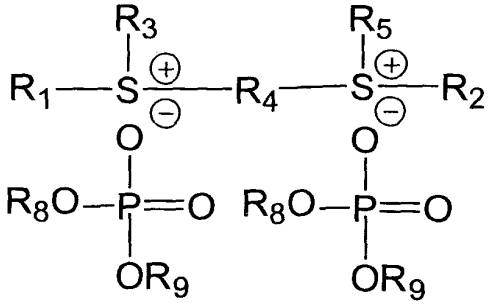

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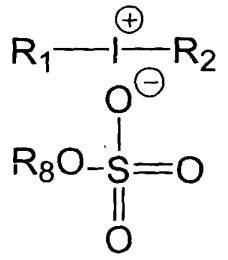

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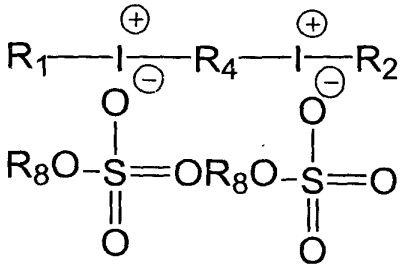

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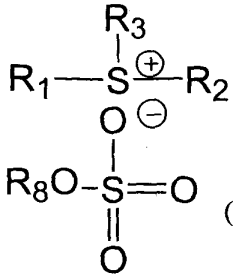

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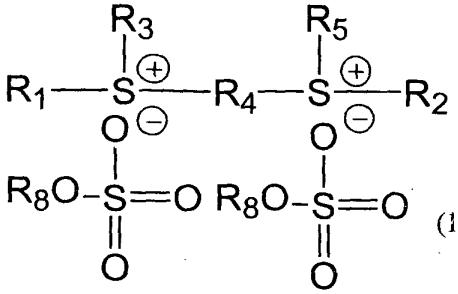


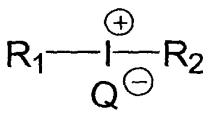
(19)

2. A method for producing an onium salt derivative according to claim 1, wherein the sulfonic acid ester represented by formula (5) is a lower alkyl sulfonate in which R_7 is a lower alkyl group having 5 or fewer carbon atoms.

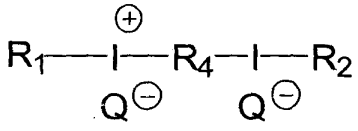
3. A method for producing an onium salt derivative according to claim 1, wherein reaction is carried out while removing generated R_7Q from the reaction system.

4. A method for producing an onium salt derivative according to claim 1, wherein the reaction is carried out in a solvent.

5. A method for producing an onium salt derivative, characterized by comprising reacting an onium salt derivative represented by any one of formulas (1) through (4):



(1)



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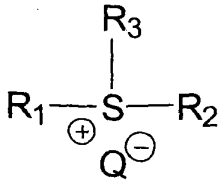
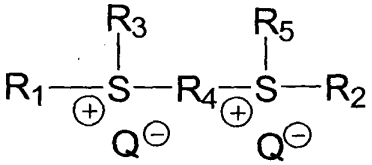


(3)

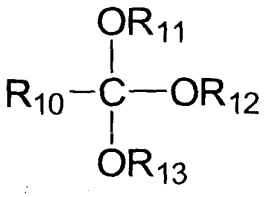


(4)

wherein each of R_1, R_2, R_3, and R_5 represents an alkyl group, a cycloalkyl group, a

perfluoroalkyl group, an aromatic organic group, an aralkyl group, or a phenacyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; one or both of the pairs of R_1 and R_3, and R_2 and R_5 may together form a divalent organic group; R_4 represents a C≤20 divalent organic group; and Q represents a halide anion or a C≤10 carboxylate anion,

with a compound represented by any one of formulas (21) through (23):



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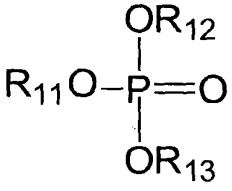

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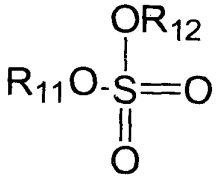


(23)

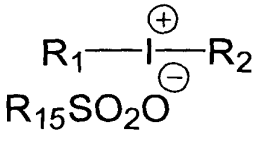
wherein R_{10} represents hydrogen or an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, or an aralkyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; and each of R_{11}, R_{12}, and R_{13} represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, or an aralkyl group, each of these groups having ≤10 carbon atoms and being optionally substituted;

and with a sulfonic acid derivative represented by formula (24):

$$R_{15}SO_2OY \quad (24)$$

wherein R_{15} represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, or an aralkyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; and Y represents a hydrogen atom, an alkali metal, or ammonium,

to thereby yield an onium salt derivative represented by one of formulas (25) through (28).



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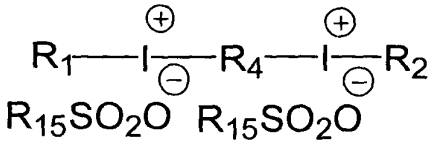

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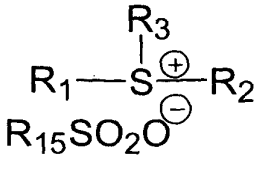

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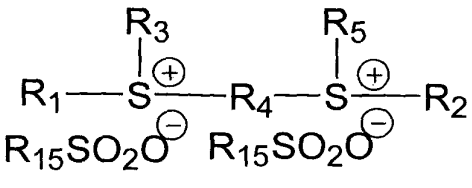
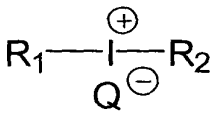


(28)

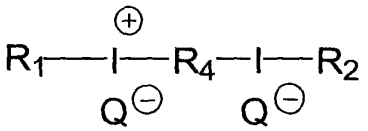
6. A method for producing an onium salt derivative according to claim 5, wherein the compound represented by any one of formulas (21) through (23) is used in an amount by mol one to ten times that of the onium salt derivative represented by any one of formulas (1) through (4).

7. A method for producing an onium salt derivative according to claim 5, wherein the sulfonic acid derivative is used in an amount by mol one to two times that of the onium salt derivative represented by any one of formulas (1) through (4).

8. A method for producing an onium salt derivative, characterized by comprising reacting an onium salt derivative represented by any one of formulas (1) through (4):



(1)



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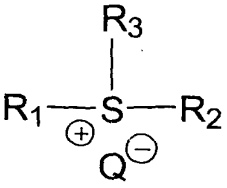

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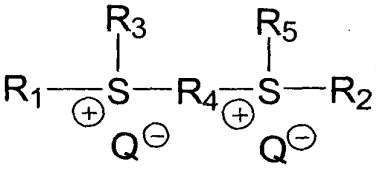
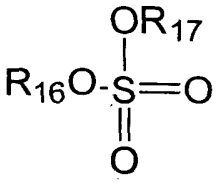


(4)

wherein each of R_1, R_2, R_3, and R_5 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, an aralkyl group, or a phenacyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; one or both of the pairs of R_1 and R_3, and R_2 and R_5 may together form a divalent organic group; R_4 represents a C≤20 divalent organic group; and Q represents a halide anion or a C≤10

carboxylate anion,

with a sulfuric acid ester represented by formula (29):



(29)

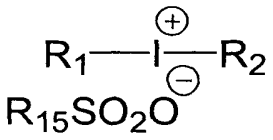
wherein each of R_{16} and R_{17} represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, or an aralkyl group, each of these groups having ≤10 carbon atoms and being optionally substituted, to thereby form an onium salt derivative,

and reacting the resultant onium salt derivative with a sulfonic acid derivative represented by formula (24):

$$R_{15}SO_2OY \quad (24)$$

wherein R_{15} represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, or an aralkyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; and Y represents a hydrogen atom, an alkali metal, or ammonium,

to thereby yield an onium salt derivative represented by one of formulas (25) through (28).



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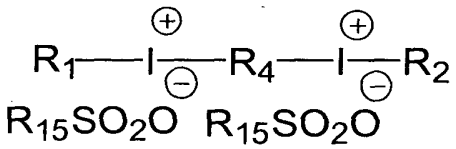

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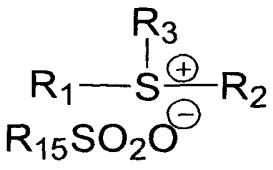

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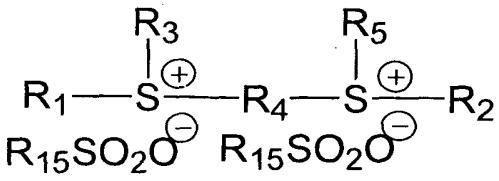
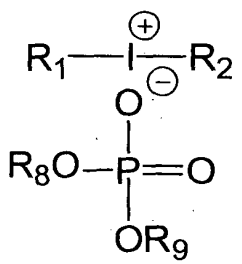


(28)

9. A method for producing an onium salt derivative according to claim 8, wherein the sulfuric acid ester represented by formula (29) is dimethylsulfuric acid or diethylsulfuric acid.

10. A method for producing an onium salt derivative, characterized by comprising

reacting an onium salt derivative represented by any one of formulas (12) through (15):



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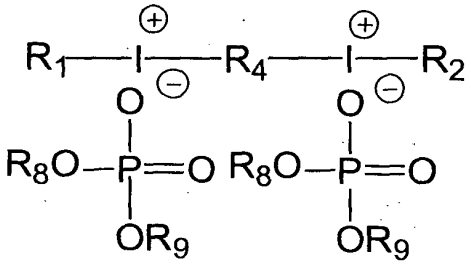

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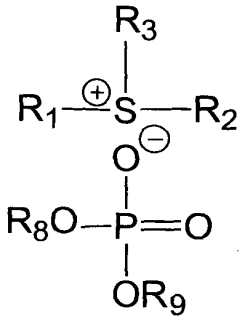

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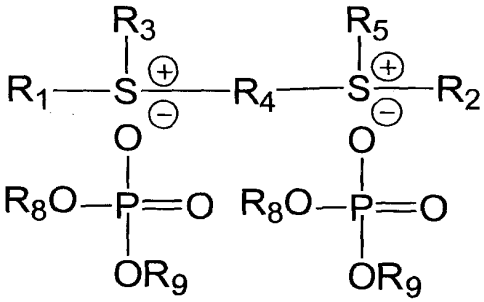


(15)

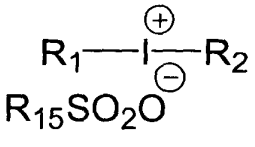
wherein each of R_1, R_2, R_3, and R_5 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, an aralkyl group, or a phenacyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; one or both of the pairs of R_1 and R_3, and R_2 and R_5 may together form a divalent organic group; R_4 represents a C≤20 divalent organic group; and each of R_8 and R_9 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, or an aralkyl group, each of these groups having ≤10 carbon atoms and being optionally substituted,

with a sulfonic acid derivative represented by formula (24):

$$R_{15}SO_2OY \quad (24)$$

wherein R_{15} represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, or an aralkyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; and Y represents a hydrogen atom, an alkali metal, or ammonium,

to thereby yield an onium salt derivative represented by one of formulas (25) through (28).



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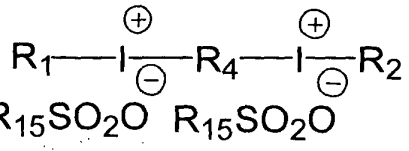

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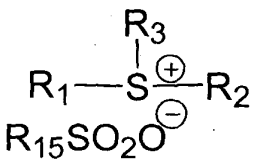

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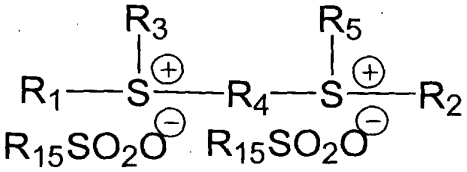
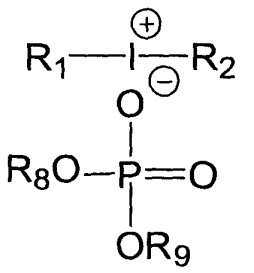


(28)

11. A novel onium compound represented by any one of formulas (12) through (15):



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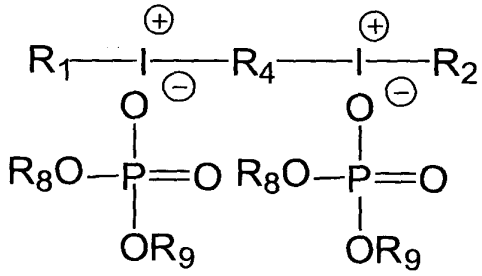
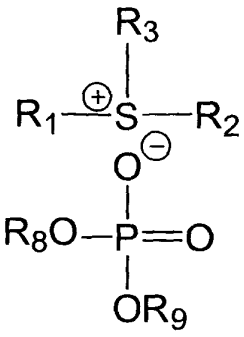
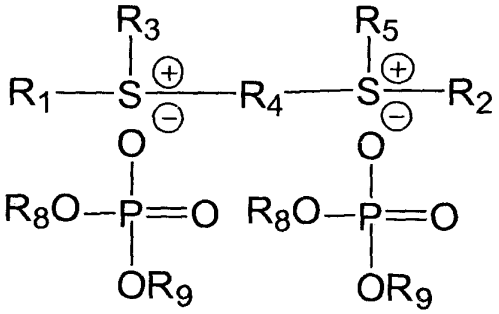


(13)



(14)



(15)

wherein each of R_1, R_2, R_3, and R_5 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, an aromatic organic group, an aralkyl group, or a phenacyl group, each of these groups having ≤25 carbon atoms and being optionally substituted; one or both of the pairs of R_1 and R_3, and R_2 and R_5 may together form a divalent organic group; R_4 represents a C≤20 divalent organic group; and each of R_8 and R_9 represents an alkyl group, a cycloalkyl group, a perfluoroalkyl group, or an aralkyl group, each of these groups having ≤10 carbon atoms and being optionally substituted.